

John Day Fish Passage and Screening

**Annual Report
2002**



DOE/BP-00005122-2

January 2003

This Document should be cited as follows:

Hartlerode, Ray, Annette Dabashinsky, Steve Allen, "John Day Fish Passage and Screening", Project No. 1993-06600, 21 electronic pages, (BPA Report DOE/BP-00005122-2)

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This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

**Oregon Department of Fish and Wildlife
Annual Report-2002
Oregon Screens Project**

Oregon Screens Project
BPA Project Number: 199306600

Contract Period: January 1, 2002 – December 31, 2002

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2002 Annual Report

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PROJECT SUMMARY

The Statement of Work addressed funding through Bonneville Power Administration for anadromous fish screening implementation. The projects occurred on private lands within the John Day, Umatilla and Walla Walla basins. The Oregon Department of Fish & Wildlife planned to replace and implement 20 fish screens and 1 fish passage project during the 2002 work period. These efforts reflect ODFW's continued commitment to protect anadromous and resident species inhabiting their spawning, rearing and migration areas. This included providing screening protection for Mid-Columbia ESU listed steelhead, USFWS listed bull trout along with a variety of resident fish species that inhabit the same areas.

INTRODUCTION

The John Day, Umatilla and Walla Walla River basins screening program began in 1952 under the Mitchell Act. Federal funds were allocated to provide fish screening of irrigation diversions to protect wild runs of salmon and steelhead in these river systems. Currently the John Day program operates 364 rotary fish screens encompassing 3 sub basins, on an annual basis. The John Day basin operates 314 screens and the Umatilla/Walla Walla basin operates 50 screens annually. Many of these systems do not operate properly because of factors involving location, screen orientation and bypass problems, along with the age of the structure and condition of the components. Since 1997, 130 BPA replacement projects have been completed in the John Day and Umatilla/Walla Walla basins.

During the mid-1990's, NMFS developed new screening criteria to meet the protection needs of endangered species. Prior to this time fish screens were designed for smolt protection only. The new criteria were designed to protect anadromous fish species during all life stages. Associated problems with the outdated fish screens include: large screen mesh, excessive approach velocities, small bypass orifices, excessive bypass slope and inadequate screen surface area. In the past, the majority of fish screen sites were located below the point of diversion at a convenient site for construction. The location, size and orientation of the old screen sites caused approach velocity, sweeping velocity and submergence problems. With proper location, size and orientation of the replacement screens, it eliminates fish impingement, bypass and submergence problems. Larger screen systems currently use multiple screens to accommodate variations in water usage and availability during irrigation season. Using multiple screens allows us to maintain criteria submergence levels throughout the irrigation season. Other improvements include changing the angles of the systems to a 45, 60 or 70 degree angle. This creates a sweeping velocity to direct fish to the bypass corridor. This is particularly important with large multiple screen systems. Variability in the number of screens in operation at any one time, per month, or year can be attributed to new ownerships, new delivery systems, water leases, water availability and different crop usage of private lands. This has caused abandonment and intermittent use of some fish screening devices within the basins.

GOALS AND OBJECTIVES

This project is necessary to insure that replacement of fish screening devices and fishways meet current NMFS design criteria for the protection of all salmonid life stages. The mission of the fish passage program in Northeast Oregon is to protect and enhance fish populations by assisting private landowners, public landowners, irrigation districts and others by maintaining fish screening devices and fishways. These facilities reduce or eliminate fish loss associated with irrigation withdrawals, and as a result insure fish populations are maintained for enjoyment by present and future generations. Assistance is provided through state and federal programs. This can range from basic technical advice to detailed construction, fabrication and maintenance of screening and passage facilities.

John Day screens personnel identified 50 sites for fish screen replacement, and one fish passage project. These sites are located in critical spawning, rearing and migration areas for spring chinook, summer steelhead and bull trout. All projects were designed and implemented to meet current NMFS criteria. It is necessary to have a large number of sites identified due to changes in weather, landowner cooperation and access issues that come up as we try and implement our goal of 21 completed projects (see Table 1).

Deliverables: Quarterly Progress Reports and an Annual Report of the project.

First Quarter Progress report was submitted for period 1/1/02 to 4/16/02. Second Quarter Progress report was submitted for period 4/17/02 to 7/09/02. Third Quarter Progress report was submitted for period 7/10/02 to 10/11/02. Fourth Quarter Progress report covered the period 10/12/02 to 12/31/02 and is contained in this annual report.

NEPA and ESA: Complete Watershed EIS Checklist and submit to BPA for review prior to contract modification for fiscal year 2002 funding.

EIS checklist completed and approved prior to project implementation.

Comply with NEPA and ESA requirements when applicable, prior to the implementation phase of the project.

NEPA process was followed and completed for the Bear Creek Project and work was scheduled for the in-stream work period 7/15-8/31. Consultation with USFWS on East Fork Canyon Creek Project was completed and work was scheduled for mid-to-late September and was contingent on fire season.

In-stream work was completed on time for the Bear Creek Project. Work outside of in-stream, such as cleanup, trash racks, and seeding of the site was finished. East Fork Canyon Creek Project was completed and flown into wilderness with Forest Service fire helicopter.

IMPLEMENTATION

2002 OVERVIEW OF ACTIVITIES

John Day Program Personnel

During fiscal year 2002, the following John Day Program personnel worked on BPA projects: (1) NMFS Principal Executive Manager – 1; (1) NMFS T/M Coordinator/Asst. Manager; (1) NMFS Office Coordinator ; (1) OWEB T/M Coordinator; (1) OWEB Engineering Technician 2; (1) OWEB Construction Inspector; (3) BPA Carpenters; (1) NMFS Carpenter; (4) OWEB limited duration Carpenters; (1) BPA Welder; (3) BPA limited duration Welders; (1) NMFS limited duration Welder; (2) OWEB limited duration Welders; (1) BPA limited duration Painter; (1) NMFS T/M Worker 2; (4) NMFS seasonal O&M Technicians; (1) BPA (vacant) Office Specialist 1(see Organizational Chart Table 4).

Work Completed

The accomplishments of the John Day, Umatilla and Walla Walla Fish Screening and Passage Program includes the following: (see Table 2)

Landowner contacts were made to obtain permission for access, timing and coordination of projects.
Project planning included consultation with appropriate agencies for water rights, priorities, NEPA compliance, permits, design and layout information.
Project site surveys that determined specific access routes, site location, system type, structure grades and bypass routes, lengths and grades.
Fabricated 10 new structure forms and reassembly of 6 structure forms.
Fabricated 6 prefab screen boxes.
Retrofitted 2 existing boxes and converted to solar.
Fabricated all screen components for 24 screening systems and 2 fishways.
Operation and maintenance of 364 existing fish screening devices (see Table 3).
Replacement of 24 outdated fish screening devices that totaled 40 screens (some were multiple screen systems).
Construction of two fish passage structures.
Construction crews poured 251 yards of concrete.
Installed 1,080 feet of bypass pipe.
Installed 9 head gates.
Installed 1 measuring device.
Screened a total of 61.31 CFS.

After the replacement of the 24 fish screening devices during 2002, we now have 130 screening devices that meet NMFS criteria. Funding for these projects was attained from BPA, NMFS and OWEB.

*Note: 4 additional projects had components fabricated, but were in various stages of field construction and were not complete at the end of this report period.

Facility / Grounds Improvements, Maintenance, and Repairs

Contracted with County to spray the grounds for weed control.
Winterizing of facility and grounds.
Winterizing of vehicles and snow tires installed.
Major scrap metal cleanup at our facility and screens scrap from the district office.
Temporary repairs of shop heating system were completed and we received bids on a new heating system.

Meetings and Training

Several employees attended BOLI and Supervisor Training classes in La Grande.
Forklift certification.
Internal monthly safety meetings and trainings were conducted.
Several employees attended a SAIFer driving course.
Two employees attended the Ag show at the Portland Exposition Center.
Several employees attended Regional meeting in La Grande, Oregon.
A Commission meeting was held here at the John Day Screen Shop.
Seven employees attended BOLI training.
The Engineering Tech. 2 attended Autodesk Land Desktop training.
Several employees attended a tri-state meeting in Salmon, Idaho.
Meetings were held with the USFS, BOR, NMFS, USFWS, WRD, NRCS and SWCD on screening issues.

2002 Division of Work Hours

<u>COST CENTER – PROJECT</u>	<u>DIVISION OF HOURS</u>	<u>TOTAL HRS.</u>
45310-355002-06 Basin 6	Regular BPA	12,581
	Holiday	548
	Vacation	902
	Sick Leave	270
	Comp. Time Accrued	100
	Comp. Time Leave	186
	Personal Business	131
	Governor's Leave	56
	Sick Leave Medical Leave Act	66
	Vacation Medical Leave Act	4
	Leave w/o Pay Medical Leave Act	146

BPA Employees Other Screen Hours

20310-882003-07	Basin 15	Regular	476
37310-437000-16	Basin 5	Regular	39
54008-945039-07	Basin 6	Regular R&E	412

TOTAL HRS.: 15,917

A picture summary sheet, which also includes an estimate of project costs, occurs on page 10. Before and after pictures of the majority of this year completed projects are on pages 11 through 17.

Attached at the end of this report is a forty-four year steelhead spawning ground summary (see Appendix 1) and a forty-four year summary of chinook spawning densities for the John Day basin (see Appendix 2).

Table 1
Identified Project Sites for the John Day Basin

Screen Site	Stream	Trib.-to	Water User	Project Status
1. Basin 6	E.F. Canyon Cr – (1)	John Day R.	Rawlins(Screen & Passage)	Complete
2. Basin 6	M.F. John Day R. – (8)	John Day R.	Holmes	
3. Basin 6	Camp Cr. – (1)	M.F. John Day R.	O'Rourke	
4. Basin 6	Camp Cr. – (2)	M.F. John Day R.	O'Rourke	
5. Basin 6	Camp Cr. – (3)	M.F. John Day R.	O'Rourke	
6. Basin 6	M.F. John Day R.- (9)	John Day R.	Gibbs	
7. Basin 6	Little Indian Cr. – (1)	John Day R.	Blagden	
8. Basin 6	Wind Cr. – (1)	S.F. John Day R.	Phillips	
9. Basin 6	S.F. John Day R. – (1)	John Day R.	Lon Stuber	
10. Basin 6	S.F. John Day R. – (2)	John Day R.	Betty Ziegler	
11. Basin 6	Bear Cr. – (3)	Bridge Cr.	Cork Norton	Complete
12. Basin 6	Bear Cr. – (4)	Bridge Cr.	Cork Norton	Complete
13. Basin 6	Cottonwood Cr. – (1)	N.F. John Day R.	Murphy	Surveyed
14. Basin 6	Cottonwood Cr. – (2)	N.F. John Day R.	Murphy	Surveyed
15. Basin 6	Cottonwood Cr. – (3)	N.F. John Day R.	Murphy	
16. Basin 6	Long Cr. – (1)	N.F. John Day R.	Livingston	
17. Basin 6	Long Cr. – (2)	N.F. John Day R.	Livingston	
18. Basin 6	John Day R. – (16)	Columbia R.	Mike Smith	
19. Basin 6	John Day R. – (19)	Columbia R.	John Coombs	
20. Basin 6	John Day R. – (42)	Columbia R.	Holmstrom	Complete
21. Basin 6	Roberts Cr. – (1)	John Day R.	Zweygardt, Jacobs, & Ricco	
22. Basin 6	John Day R. – (35)	Columbia R.	Holliday	Complete
23. Basin 6	Deer Cr. – (1)	NF John Day R.	Fields (unscreened)	Complete
24. Basin 6	Service Cr. – (1)	John Day R.	Potter	Complete (Solar conversion)
25. Basin 6	Service Cr. – (2)	John Day R.	Potter	Complete (solar conversion)
26. Basin 6	Belshaw Cr.- (1)	John Day R	Tirico	Complete
27. Basin 6	Belshaw Cr.- (3)	John Day R	Tirico	Complete
28. Basin 6	Belshaw Cr.- (4)	John Day R	Tirico	Complete
29. Basin 6	Bear Cr. – (2)	Bridge Cr.	Norton	Complete
30. Basin 6	Service Cr. – (3)	John Day R.	Spaulding (unscreened)	Complete
31. Basin 6	Rock Cr. – (7)	John Day R.	US Park Service	Surveyed
32. Basin 6	Bridge Cr. – (1)	John Day R.	GI Ranch (unscreened)	Surveyed

Table 1 (Cont)

33. Basin 6	Belshaw Cr.- (2)	John Day R	Tirico	Complete
34. Basin 6	Gable Cr. – (2)	Bridge Cr.	Fisher	Complete
35. Basin 6	W. Bridge Cr. – (2)	Bridge Cr.	Geer	Complete
36. Basin 6	W. Bridge Cr. – (3)	Bridge Cr.	Woodward	Complete
37. Basin 6	SF John Day – (3)	John Day R.	Moss	Complete
38. Basin 6	Bear Cr. – (1)	John Day R.	Ricco	Complete
39. Basin 6	Bear Cr. – (1)	John Day R.	Ricco (passage)	Complete
40. Basin 6	Canyon Cr. – (5)	John Day R.	Larson	Complete
41. Basin 6	Berry Cr. – (1)	Canyon Cr.	Larson	Complete
42. Basin 6	Canyon Cr. – (2)	John Day R.	Baucum	Surveyed
43. Basin 6	Canyon Cr. – (8)	John Day R.	Thunnel	Surveyed
44. Basin 6	Rudio Cr. – (1)	NF John Day R.	Hermans	Complete
45. Basin 6	John Day R. – (66)	Columbia R.	Clausen	Surveyed
46. Basin 6	Murderers Cr. – (4)	SFJohn Day R.	Wildlife Area	Complete
47. Basin 6	Murderers Cr. – (1)	SFJohn Day R.	Wildlife Area	Fabricated
48. Basin 6	Murderers Cr. – (4)	SFJohn Day R.	Wildlife Area	Fabricated
49. Basin 6	John Day R. – (60)	John Day R.	Stout	Fabricated
50. Basin 6	S. Fork John Day R. (4)	John Day R.	Rixsen	Fabricated

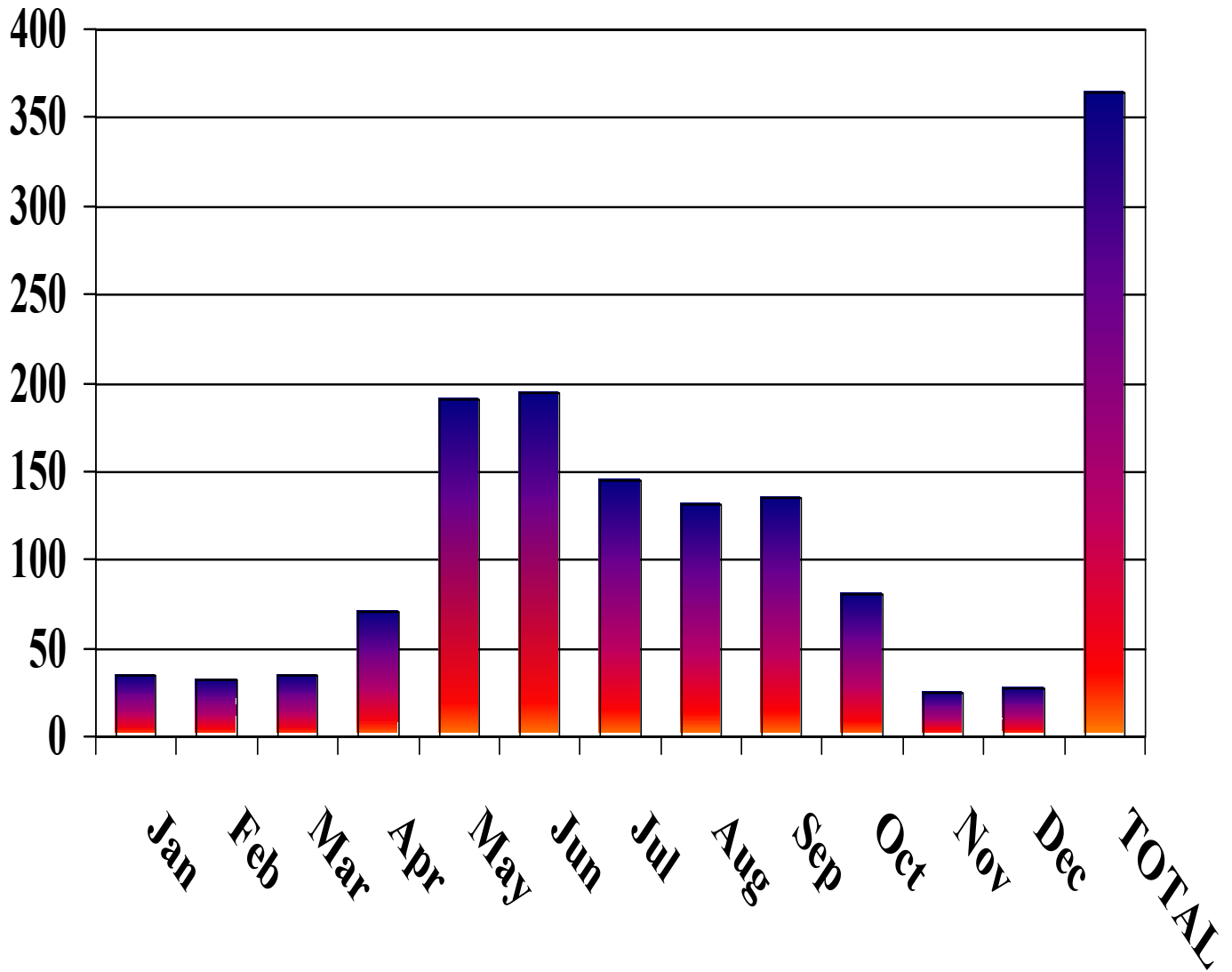
Table 2
Completed Fish Screen Projects

<u>Site #</u>	<u>Screen Size</u> <u>Degree/Bays</u>	<u>Drive</u>	<u>CFS</u>	<u>Structure</u>	<u>Concrete</u> <u>yds.</u>	<u>Bypass</u> <u>ft.</u>	<u>Headgate</u>	<u>Measure</u> <u>Device</u>
11	3x18 @ 90 single	Solar	0.38	new forms	4	10		
12	3x18 @ 60 single	Gravity	0.38	reassembled	6	80		
20	9x24 @ 60 single	Solar	4.72	new forms	14	110		
22	6x24 @ 60 dual	Gravity	6	reassembled	18	200		
23	5x24 @ 60 dual	Gravity	4.62	new forms	18.5	35	concrete	
24	2x14 @ 90 single	Solar	0.155	prefab/conversion				
25	2x14 @ 90 single	Solar	0.155	prefab/conversion				
26	3x24 @ 60 dual	Gravity	1.13	new forms	11.5	45		
27	3x24 @ 60 dual	Gravity	0.55	reassembled	19.5	20	concrete	
33	3x24 @ 60 dual	Gravity	0.55	reassembled	18.5	31	concrete	
34	5x24 @ 60 dual	Solar	2.27	new forms	10.5	34		
38	5x24 @ 60 dual	Gravity	4.62	new forms	21	154	concrete	
1	2x21' @ 55 wiper	Gravity	6	prefab	1.5	20	prefab	
28	3.5x3	Solar	0.24	new forms	6	0	prefab	
30	2x30 @ 90 wiper	Solar	0.157	prefab/fixed plate		20		
35	3x18 @ 90 single	Gravity	0.78	prefab		40		
36	4x24 @ 60 single	Gravity	1.05	reassembled	15.5	20	concrete	
40	3x24 @ 90 single	Solar	1.28	prefab		11	prefab	
44	4x30 @ 60 dual	Gravity	8	new forms	27.5	60	concrete	
37	3x24 @ 60 dual	Gravity	1.27	reassembled	26	60	concrete	
39	Rock weir passage							
41	18x36 wiper	Solar	1.2	new forms	4	20		
46	5x24 @ 60 single	Solar	2.7	new forms	10	40		prefab
29	22' fixed plate wiper	Solar	13.1	new forms	19	70	concrete	
Totals	24		61.31		251	1080		

Components Fabricated, various stages of field construction

47	4x18 @ 60 single	Gravity		prefab	4 yds	100 ft.		prefab
48	6x24 @ 60 single	Gravity	2.75	reassembled				prefab
49	9x30 @ 60 single	Solar	5.8	reassembled				
50	7x4x36 @ 60 dual	Gravity	8.18	prefab				

Table 2
SCREENS IN OPERATION FY 2002

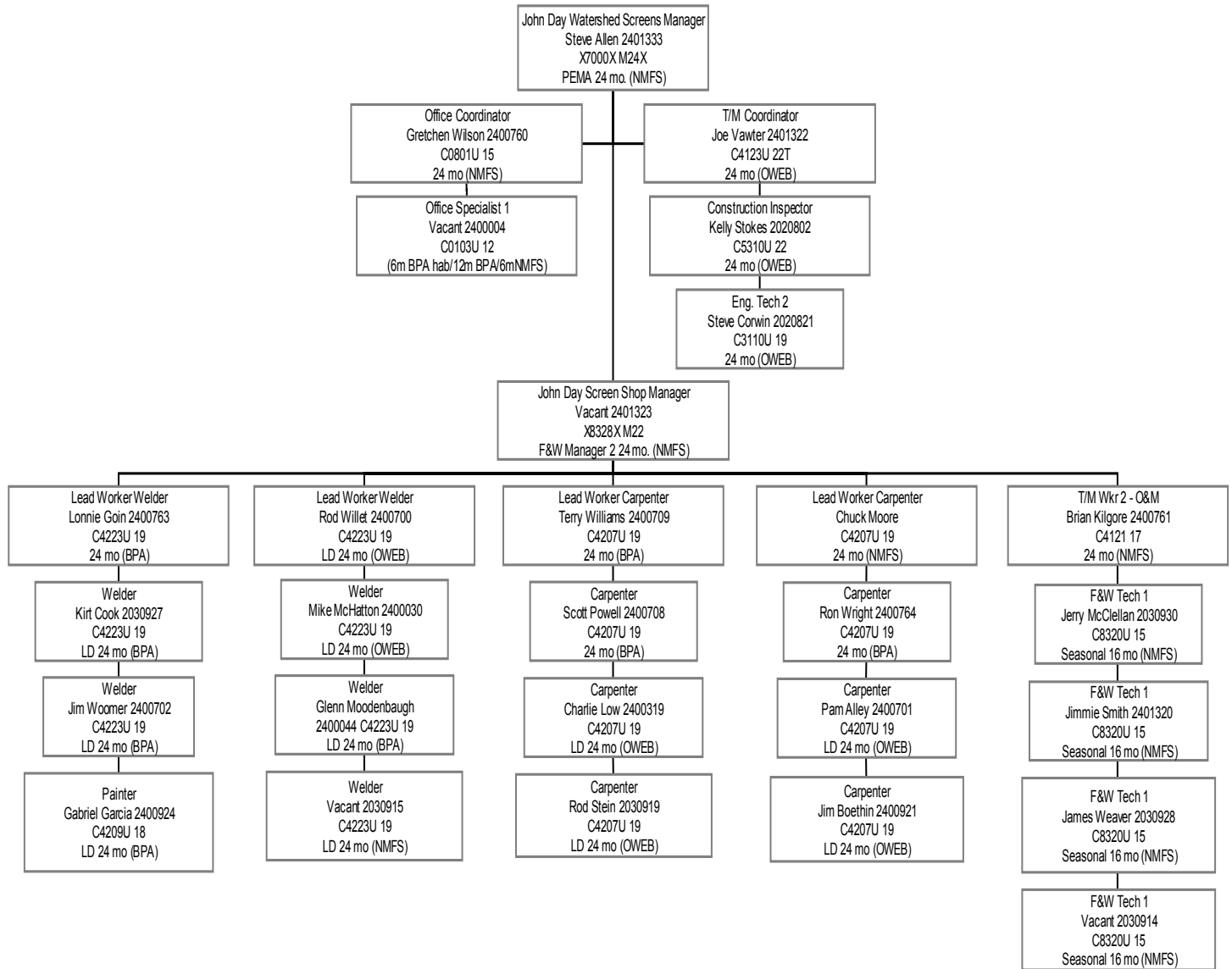


*364 screens operated and maintained. The most screens in operation at any one time were 194. This was due to weather conditions, water quantity, water leases and agricultural crop harvesting.

Table 3

John Day Watershed District Fish Screen and Passage Program

January 2003



Project Picture Information

SITE#	LOCATION	SCREEN TYPE	SCREEN SIZE	CFS	EST.COST
1	E. FORK CANYON CR. NO 1	WIPER & FISHWAY	16ft.x30"	6	\$ 46,212
11	BEAR CR. NO. 3	ROTARY DRUM	3X18	0.38	\$ 8,153
12	BEAR CR. NO. 4	ROTARY DRUM	3X18 (SOLAR)	0.38	\$ 9,779
20	JOHN DAY RIVER NO. 42	ROTARY DRUM	9X24 (SOLAR)	4.72	\$ 25,317
22	JOHN DAY RIVER NO. 38	ROTARY DRUM	6X24 DUAL	6	\$ 18,152
23	DEER CR. NO. 1	ROTARY DRUM	5X24 DUAL	4.62	\$ 25,281
26	BELSHAW CR. NO. 1	ROTARY DRUM	3X24 DUAL	1.13	\$ 13,170
27	BELSHAW CR. NO. 2	ROTARY DRUM	3X24 DUAL	0.55	\$ 16,196
28	BELSHAW CR. NO. 4	BELT SCREEN	3'X3.5'	0.55	\$ 12,213
29	BEAR CR. NO. 2	FIXED PLATE WIPER	3'X22'	13.7	\$ 38,729
30	SERVICE CR. NO. 3	FIXED PLATE WIPER	24"X30"	0.15	\$ 9,573
33	BELSHAW CR. NO. 2	ROTARY DRUM	3X24 DUAL	0.38	\$ 15,566
34	GABLE CR. NO. 1	ROTARY DRUM	5X24	2.27	\$ 16,019
35	BRIDGE CR. NO. 2	ROTARY DRUM	3X18 (PREFAB)	0.78	\$ 14,014
37	S.F. JOHN DAY RIVER NO. 5	ROTARY DRUM	3X24 DUAL	1.27	\$ 25,081
38	BEAR CR. NO. 1	ROTARY DRUM	5X24 DUAL	3.8	\$ 19,854
39	BEAR CR. NO. 1	DIVERSION & ROCK WEIRS	N/A	3.8	\$ 74,664
40	CANYON CR. NO. 5	ROTARY DRUM	3X24 DUAL	1.28	\$ 11,631
41	BERRY CR. NO. 1	FIXED PLATE WIPER	24"X30"	0.5	\$ 15,600
46	MURDERERS CR. NO. 4	ROTARY DRUM	5X24 (SOLAR)	2.15	\$ 17,501
50	S.F. JOHN DAY RIVER NO. 4	ROTARY DRUM	4'X7'X36" (PREFAB)	8.18	\$ 29,113
					<hr/> \$ 461,818



E. FORK CANYON CR. SITE #1
REPLACEMENT PROJECT



E. FORK CANYON CR. SITE #1
COMPLETED 16' FIXED PLATE WIPER



LOWER BEAR CR. SITE #11
REPLACEMENT PROJECT



LOWER BEAR CR. SITE #11
COMPLETED 3X18 SINGLE



LOWER BEAR CR. SITE #12
REPLACEMENT PROJECT



LOWER BEAR CR. SITE #12
COMPLETED 3X18 SOLAR



JOHN DAY RIVER SITE #20
REPLACEMENT PROJECT



JOHN DAY RIVER SITE #20
COMPLETED 9X30 SOLAR



JOHN DAY RIVER SITE #22
REPLACEMENT PROJECT



JOHN DAY RIVER SITE #22
COMPLETED 6X24 DUAL



DEER CR. SITE #23
REPLACEMENT PROJECT



DEER CR. SITE #23
COMPLETED 5X24 DUAL



BELSHAW CR. SITE #26
REPLACEMENT PROJECT



BELSHAW CR. SITE #26
COMPLETED 3X24 DUAL



BELSHAW CR. SITE #27
REPLACEMENT PROJECT



BELSHAW CR. SITE #27
COMPLETED 3X24 DUAL



BELSHAW CR. SITE #28
REPLACEMENT PROJECT



BELSHAW CR. SITE #28
COMPLETED 3'X3.5' BELT SCREEN



UPPER BEAR CR. SITE #29
REPLACEMENT PROJECT



UPPER BEAR CR. SITE #29
22' FIXED PLATE WIPER



SERVICE CR. SITE #30
REPLACEMENT PROJECT



SERVICE CR. SITE #30
COMPLETED 24"X30" FIXED PLATE WIPER



BELSHAW CR. SITE #33
REPLACEMENT PROJECT



BELSHAW CR. SITE #33
COMPLETED 3X24 DUAL



GABLE CR. SITE #34
REPLACEMENT PROJECT



GABLE CR. SITE #34
COMPLETED 5X24 (SOLAR)



BRIDGE CR. SITE #35
REPLACEMENT PROJECT



BRIDGE CR. SITE #35
COMPLETED 3X18 PREFAB



S.F. JOHN DAY RIVER SITE #37
REPLACEMENT PROJECT



S.F. JOHN DAY RIVER SITE #37
COMPLETED 3X24 DUAL



UPPER BEAR CR. SITE #38
REPLACEMENT PROJECT



UPPER BEAR CR. SITE #38
COMPLETED 5X24 DUAL



UPPER BEAR CR. SITE #39
COMPLETED PERMANENT DIVERSION



UPPER BEAR CR. SITE #39
COMPLETED PASSAGE PROJECT



CANYON CR. SITE #40
REPLACEMENT PROJECT



CANYON CR. SITE #40
3X24 SOLAR (PREFAB)



BERRY CR. SITE #41
REPLACEMENT PROJECT



BERRY CR. SITE #41
COMPLETED 24"X30" PREFAB WIPER



MURDERERS CR. SITE #46
REPLACEMENT PROJECT



MURDERERS CR. SITE #46
COMPLETED 5X24 SOLAR



S.F. JOHN DAY RIVER SITE #50
REPLACEMENT PROJECT



S.F. JOHN DAY RIVER SITE #50
FABRICATED 7'X4'X36" DUAL (PREFAB)

Appendix 1
Forty four year steelhead spawning ground summary

John Day Fish District.

Year	Number of Streams Surveyed	Miles Surveyed	Live Steelhead	Redds	Redds Per Mile
1959	6	14.5	30	108	7.4
1960	10	22.0	60	194	8.8
1961	8	24.5	56	166	6.8
1962	10	26.5	56	184	6.9
1963	11	30.5	47	216	7.1
1964	13	43.5	51	266	6.1
1965	19	45.0	88	344	7.6
1966	23	69.0	141	1103	16.0
1967	25	78.0	61	905	11.6
1968	23	74.5	19	358	4.8
1969	27	91.5	76	806	8.8
1970	21	65.0	58	530	8.2
1971	8	22.5	18	181	8.0
1972	16	53.5	41	409	7.6
1973	25	76.4	22	402	5.3
1974	14	38.0	4	167	4.4
1975	14	34.0	21	302	8.9
1976	21	59.8	8	308	5.2
1977	30	75.5	69	535	7.1
1978	35	102.7	21	438	4.3
1979	29	78.7	4	81	1.0
1980	34	90.1	11	305	3.4
1981	33	86.1	12	319	3.7
1982	32	71.8	34	301	4.2
1983	31	89.3	39	438	4.9
1984	29	76.7	33	299	3.9
1985	39	120.3	88	1016	8.4
1986	43	120.6	129	1323	11.0
1987	61	154.3	82	1757	11.4
1988	46	128.0	111	1551	12.1
1989	35	106.5	42	340	3.2
1990	39	114.3	37	451	3.9
1991	29	91.9	8	225	2.4
1992	35	107.3	70	608	5.7
1993	24	68.0	14	166	2.4
1994	38	114.6	6	352	3.1
1995	34	104.1	8	135	1.3
1996	35	100.8	9	225	2.2
1997	33	96.5	15	165	1.7
1998	27	70.6	4	134	1.9
1999	28	79.6	20	169	2.1
2000	30	89.7	8	366	4.1
2001	29	85.7	75	433	5.1
2002	35	105.2	189	876	8.3
TOTALS	1187.0	3397.6	1848.0	19524.7	260.0
AVERAGE	26.9	77.2	44.0	443.7	5.9

Appendix 2
Summary of Chinook salmon spawning density, John Day Fish District, 1959-2002.

Redds/mile								
Year	Bull Run	Clear Cr.	Granite Cr.	Granite System	Upper JDR	MF John Day	NF John Day	Total
1959	*	4.3	6.0	5.3	0.3	0.0	*	2.6
1960	*	16.3	10.0	12.5	0.7	3.2	*	7.5
1961	*	3.3	5.3	4.5	3.0	1.1	*	3.2
1962	2.0	49.7	44.2	44.3	12.2	2.8	*	22.2
1963	7.0	29.2	26.4	28.4	0.8	0.4	*	12.7
1964	10	49.7	34.8	38.3	1.3	3.6	7.8	17.8
1965	7.5	16.7	24.4	18.5	5.8	3.7	8.1	11
1966	0.3	43.5	31.0	28.4	9.3	6.5	10.3	16.8
1967	6.0	38.5	19.4	23.1	7.4	1.7	5.5	13
1968	6.4	60.5	50.2	44.3	0.7	0.4	8.8	14.4
1969	15.6	13.7	16.8	15.9	9.3	4.8	20.5	13.3
1970	26.4	18.7	33.6	26.9	8.3	7.6	16.8	14.1
1971	11.6	18.8	31.2	22.6	7.0	4.1	11.8	11.5
1972	24.4	39.5	43.5	38.2	3.9**	5.1	10.5	14.2
1973	7.2	27	36	27	8.9	4.3	19.4	15.7
1974	7.6	8.0	25.5	15.9	2.5	8.1	7.2	8.2
1975	18.8	11.5	24.7	19.1	7.1	8.9	11.7	11.7
1976	9.2	7	20.2	13.5	4.6	6.6	6.2	7.5
1977	11.6	12.8	23.1	17.3	4.9	5.8	16.4	11.1
1978	12.4	6.3	19.8	13.8	4.5	10.7	5.9	8.3
1979	6.4	7.0	15.6	10.8	5.2	11.8	11.1	9.7
1980	1.2	7.0	8.5	6.5	1.2	5.8	4.3	4.3
1981	2.8	11.3	10.6	9.2	3.9	2.6	7.7	6.1
1982	5.2	10.8	12.0	10.2	3.8	6.2	5.5	6.4
1983	0.8	1.0	7.3	3.8	10.2	5.1	4.2	5.8
1984	3.2	2.0	5.8	4	5.6	6.7	3.5	4.4
1985	6.4	8.2	15.1	11	8.9	4.0	6.1	7.5
1986	2.4	11.5	20.2	13.6	12.2	6.3	14.3	11.9
1987	5.6	14	12.9	11.8	19	28.3	20.8	20.2
1988	1.2	11.0	12.5	9.7	6.3	20.1	13.6	12.4
1989	6.0	16.7	12.2	12.4	12.7	9.4	10.9	11.3
1990	2.4	2.7	11.1	6.5	9.5	3.9	14.3	9.2
1991	1.6	5.2	5.5	4.6	4.7	2.9	6.4	4.8
1992	0.0	11.7	16.5	11.5	10.9	9.0	18.8	13.2
1993	17.6	25.6	19.8	21.3	10.4	12.9	21.1	16.9
1994	0.0	4.0	14.5	8	13.0	7.8	11.2	10.2
1995	0.0	2.8	2.2	1.9	2.2	1.3	1.5	1.7
1996	3.6	9.5	14.7	10.7	17.5	11.3	16.2	14.2
1997	7.2	7.2	10	8.5	9.6	13.6	10.9	10.7
1998	0.4	2.8	8.4	4.8	8.3	6.6	5.6	6.4
1999	3.2	3.8	11.6	7.3	4.5	8.8	6.7	6.7
2000	4.8	20.0	28.0	20.5	28.1	30.6	26.9	25.7
2001	15.2	20.0	18.9	18.5	29.5	16.6	33.7	25.7
2002	9.7	18	19.3	16.5	37.2	21	29	26.5